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# NOTES ON THE OPEN-AIR OR HYGIENIC TREATMENT OF PHTHISIS.

## WITH SPECIAL REFERENCE TO THE HIND HEAD DISTRICT OF HAMPSHIRE AS A HEALTH RESORT FOR CONSUMPTIVES.

BY

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# NOTES ON THE OPEN AIR OR HYGIENIC TREATMENT OF PHTHISIS,

With special reference to the Hind Head district of Hampshire as a health resort for Consumptives.

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## HISTORICAL:

The open-air treatment of Phthisis is based on strict hygienic and dietetic principles which must be carried out under the direct supervision of a physician. The fact that prolonged treatment frequently becomes distasteful to the patients and tiresome to the relatives renders this fact the more important.

The treatment cannot be described as a novel one, as it was recommended by Hippocrates. Galen recognised the value of fresh air in phthisis and Artaeus, speaking of consumptives, says: "Living by the sea will be beneficial." It is, however, only within comparatively recent years that the method has been conducted on a regular system and that sanatoria have been established and patients subjected to a rigid observation of well defined rules, the results of collected experiences. It is now generally admitted that no other mode of treatment gives results which can in any way compare with those derived from

the open air method. A paper by Sir Samuel Wilks in the "Practitioner" of June /98, after discussing the various cures for consumption which have been promoted and disappeared, concludes: "The only remedies I know of for consumption are air and sunshine." Had Sir Samuel here added "combined with a systematic and regular improvement in diet, proper regulation of rest and exercise and attention to the laws of Hygiene" he would have expressed the views of the whole of the profession.

I t has long been known that consumptives, on being removed from sea-level and valleys to high altitudes, in many cases w are cured, and in most cases w are benefited by the change. Among the first to systematically practice the transportation of consumptives to high altitudes were the late Dr. Archibald Smith(a), Guilbert and Herman Weber.

The first named practised in Peru and Bolivia and made it the rule to send all suitable cases of Phthisis to reside in the Andes. It was the publication of his cases that largely drew the attention of the profession to what is now recognised as the only treatment from which we may hope for good results. A haphazard life with uncomfortable surroundings was, however, little calculated to suit the majority of

(a) Climate of Swiss Alps and Peruvian Andes compared.

patients, especially those of the better class. Hence arose the need of specially constructed sanatoria, where the patient could be under the constant supervision of a medical man.

The first sanatorium to be established was in 1859 at Gorbersdorf in Silesia by the late Dr. Brehmer. Similar institutions soon followed, notably Falkenstein (Dettweiller) Davos (Turban) St. Moritz, Leysin, and Hohenhomef on the Rhine, Rieboldsgrum in Saxony, Nordrach and St. Blasien in the Black Forest: France, Norway, Russia and America followed suit in the erection of similar establishments.

Up to 1892 these institutions were however of a commercial nature, being founded as private speculations and were only available for those with means. Since that date a crusade has been started in Europe and America against tuberculosis and the necessity of establishing sanatoria for the poor has been brought prominently forward. Many societies, under influentialpatronage, ~~have been~~ formed on the Continent for the repression of tuberculosis, and their efforts, combined with substantial private contributions, have been the means of instituting the erection of sanatoria for the poor.

The major portion of these has been erected in Germany; but others in France, Norway, Russia and the United States. One of them in Russia has been founded by the Czar out of his private purse(a). The leading society in Germany is under the patronage of the Emperor(b). In the latter country, where the insurance against sickness and old age is very general, statistics of Phthisis figure very prominently in the returns of the insurance societies, so much so that they have found it to their advantage to subsidise and even erect sanatoria of their own for the use of consumptives insured in their office. For 1897 the number of cases of phthisis assisted by 37 insurance societies was 4480 and of these no fewer than 4432 were sent to subsidised sanatoria(c). This country, usually in the van of hygienic progress and reform, has decidedly lagged behind in the general promotion of the open air treatment. This may be largely attributed to the idea that our changeable climate is unsuited to such treatment and partly to the fact that many Continental sanatoria are within comparatively easy reach. That the idea of unsuitability of climate is wrong has been abundantly proved. The statistics of many sanatoria differing widely as to

(a) Heilstatten Korrespondenz.
(b) Ibid.
(c) Ibid.

their climatology seem to prove that, given a pure air and a suitable subsoil, the treatment can be as successfully carried out in one climate as another (a). Dr. Burton Fanning has for some years conducted the treatment at a Convalescent Home at Cromer; his results certainly encourage us to more fully adopt the treatment in this country(b).

Many other medical men, notably Dr. Philip(c) of Edinburgh, Dr. Pott, and Dr. Johns of Bournemouth, have adopted and speak most highly of the method. I, myself, have followed out the treatment for the past two years on a limited scale. Not being possessed of the wherewithal to establish a sanatorium, I have had to resort to the use of tents and small wooden buildings with moveable sides.

Since July 1898 an association for the repression of tuberculosis has been formed in London with branches in most of the large provincial towns. It is asserted by some, among whom may be mentioned Dettweiller, v. Leyden and Gerhardt, that a cure effected in the native country of the patient is more assured than one effected in a more genial clime. Such a statement may well stimulate British physicians to adopt and follow out the treatment in its entirety.

(a) Leon Petit: "Le Phthisique et son traitement Hygienique."
Williams: "Lancet" Nov. 20th, 1897.
(b) Lancet, Mar. 5th, 12. 26. 1898. & Practitioner June '98.
(c) Brit. Med. Journal. July 23/98, P.217.

In this country, so far as I know, there is only one institution where the poor can receive the benefits of the open air treatment. I refer to the Victoria Hospital for Consumptives at Craigleith, Edinburgh, where, under the guidance of Dr. Philip and others of the staff, the method has been in use for nearly five years with most satisfactory results. Doubtless, when the British Public become sufficiently impressed with the absolute necessity of providing sanatoria for the consumptive poor, the means for doing so will not be long in forthcoming.

THE QUESTION OF CLIMATE.

To appreciate the influence of climate in the open-air treatment of Phthisis it is necessary to consider in some detail the effect of the various climates and the various elements of climates of the world on the Phthisis rate.

Pure Air: Pure air is almost an absolute essential, and sunshine, though not always obtainable, is a most valuable adjunct for success in the open-air treatment of Phthisis. Pure air and sunshine will not however cure a consumptive by themselves and sad indeed would soon be the plight of the patient who had to live on them. Proper dieting, improved

nutrition and precise regulations of rest and exercise according to the nature of the case are equally important factors. The difficulty of instilling into the minds of the public that fresh air - and plenty of fresh air too - will not hurt the consumptive is very great. I venture to state that, in nine cases out of ten, the physician on paying a first visit to a phthisical patient, especially of the poorer classes, finds him boxed up in a stuffy room with all apparent egresses and ingresses for air carefully stopped up. Often enough the suggestion that windows and doors should be left open is received with almost horror,and visions of a "chill" and an early death are easily conjured up by the patient and friends. Among the better classes the fallacy is gradually losing ground and it is to be hoped it will soon be entirely rooted out. It is no uncommon experience to meet with people who vigorously expound the benefits of fresh air, but whose practice compares unfavourably with their theory. There is a common idea that consumptives are more liable to "chills" than healthy people. Taking it for granted that a cold or chill is due to a specific infection there is no proof that they are more liable provided they are kept from any possible source of infection.

In order that this most desirable state may be attained the air must be as nearly as possible absolutely pure. Doubtless common colds are far more common in crowded places ,which, to my mind, proves they are due to a specific infection, the organism flourishing in the impure air. Hence the necessity that a sanatorium should be located in a place where the air is uncontaminated by smoke, dust and other deleterious matter.

In instituting the treatment in any case it is most important that the patient be inspired with confidence in the method; otherwise he goes about it in a half-hearted way. It should be the aim of the physician to develop in the patient a profound contempt for bad weather and a desire to be always in the open air. Many patients take unkindly to the treatment at first and require considerable tact to manage them; their periods of being in the open air, their exercises and their food being gradually increased. The morose patient, who looks upon the dark side of life and cares not whether he live or die, is the most difficult to deal with. Those in whom the Spes phthisica is present are much more manageable; their anxiety to live and get well renders them more pliable and they readily seize on any method which, they are told, will assist in their recovery.

In races of people living an open-air life phthisis is practically unknown. If, however, these people forsake their nomadic existence and take to living in stone houses and herding together, the disease rapidly asserts itself and plays an important part in the death-rate of the population. Numerous examples may be given of this fact. Dr. M$^{c}$Cormack in his work "On the Breath Rebreathed" quotes, amongst others, the natives of Labrador as an instance.

Ruchke says: "Icelanders frequently contract the disease on removal to Denmark and so also do negroes brought from the interior of Africa to the Coast or to Europe." The Highlanders who live in well-built stone houses on the Mainland of Scotland suffer from Phthisis, whereas their brothers, often ill-clad and underfed in the Western Hebrides and St. Kilda, but leading an open-air life as fishermen, rarely contract the disease.

The natives of New Zealand since their adoption of the habits of civilisation have suffered frightful ravages from consumption. The same statement applies almost universally with native races who, coming under the influence of civilization, change the mode of their life from an open-air one to a more or less confined one. Uncivilised races are however not exempt from Phthisis and in fact some of them seem particu-

larly prone to the disease. Hirsch remarks that consumption is present to a disastrous extent amongst the native races of the Southern Pacific.

With a few exceptions, however, the increase of the Phthisis rate, is co-incident with the spread of civilisation, the change from an open-air life to a more confined one, the establishment of manufactories, and the crowding of large number of people together in a limited space, all combining to produce the commonest cause of Phthisis, viz., impure air.

As will be subsequently shown, those districts possessing a pure air, other conditions being favourable, show an almost absolute immunity from Phthisis. Impure air is to a large extent an artificial product and on account of its proclivity to foster and perpetuate the bacilli of tubercle it behoves us in the treatment of Phthisis, if we hope for success, to obtain its contrary, viz., pure air.

Wind. Wind cannot be said to be altogether inimical to consumptives. At most of the Continental Sanatoria the patients are protected as much as possible from wind, especially Northerly and Easterly winds. But this, I gather, is not from any fear that the winds would prove altogether hurtful to the patients, but largely to add to their comfort. At sea, unless

the patient remains below he cannot very well avoid the wind. In fact I firmly believe that the almost constant exposure to wind on board ship is a most powerful factor in promoting the recovery of the patient. Again, on high exposed uplands and plateaux, apart from any dyspnoea, the consumptive derives no harm from the wind. I do not wish to advocate indiscriminate exposure to all and every wind but simply to illustrate the fact that wind as a whole, is not hurtful to the consumptive. If however, the patient reside in a district where with certain winds the air is rendered less pure by the presence of smoke etc., from towns at a distance he should be instructed to take precautions to avoid them. At Nordrach exposure to wind and weather is encouraged to an extreme. To mention a case in point; a friend of mine who was a patient there on retiring to bed one night, thinking the current of air to strong, closed the window. Next night it was snowing so he essayed to close the window again, but found that it had been removed bodily from the frame.

A consumptive should not undertake any exertion in the face of a strong wind owing to the probability of dyspnoea setting in. This danger of causing dyspnoea constitutes the chief objection to wind. When reclining or sitting in the open-air patients

should be well protected from wind especially Northerly and Easterly, because of their chilling effect. We must not lose sight of the purifying action of winds, by carrying away accumulations of smoke and dust. The question of the effect of wind on the results of the open-air treatment is a very wide one and whether the patient should be exposed to the wind at all times, or sometimes or never ,should, I think be left to the decision of the physician attending the case. Any dogmatic statement on the subject is impossible ,as a certain wind in one district may be favourable to the patient and as distinctly unfavourable in another district , depending, of course, on the locality.

Smoke & Dust. It is most important that smoke and dust be avoided if possible at all times by the consumptive. If only their irritating effect on the Laryngeal and Bronchial Membranes be considered there is reason enough to take strenuous precautions to avoid them and when it is remembered that both, and especially smoke, are associated with centres of life and traffic, the reason becomes more apparent still. It is the presence of dust in the air at times that forms the chief objection to desert life, but its effect here is purely irritative, it

does not bear along with it the germs of other diseases which is the case in populous districts. It is perhaps stretching a point to bring smoke and dust into consideration when treating of climatic factors, but I think their frequent association with the surroundings of Phthisical patients is sufficient excuse to allow of a short dissertation.

Rain & Mist. Any detrimental effect rain and mist may have on the consumptive is often quite secondary and largely the result of the patient's own misdeeds. At the first appearance of either he at once retires to his room, closes all doors and windows carefully and if the inclement weather is protracted there he remains boxed up until a return of fine weather. He then ventures out, after a period of "coddling up" and is perhaps caught in either a shower or fog and not being in a condition to withstand them he is probably seized with a relapse and exacerbation of all symptoms, such as cough temperature and perhaps pleurisy or pneumonia. If the patient had been gradually "hardened" to withstand the effect of the moisture he would in all probability have been none the worse. Naturally the patient and friends draw the only possible conclusion viz. that the relapse was due to the rain or mist and eloquent indeed must be the medical man,

Who can subsequently persuade the patient to go out in either. I do not wish to assert that the patient should be so exposed as to get wet through (though this is thought nothing of at Nordrach). He should be well and warmly clothed with flannel next the skin and thick boots on the feet. Mackintoshes should not be worn as they cause perspiration and retention of the heat and when removed the patient very easily catches a cold. If the patient is at rest in the open-air he should be well protected from rain. Dettweiller and others assert that moisture in the air has a soothing effect on the Laryngeal and Bronchial Membranes, causing reduction in the amount of coughing. Dr. Burton Fanning[a] on the other hand states that rain is hurtful to the consumptive. I have carefully watched the effect of moisture in the air in several cases and have certainly noticed that the patients seem none the worse on damp and foggy days. Two of my cases resided on the banks of a river and both told me that they coughed less at nights when there was a mist from the river. Whether or not this may have been a coincidence, I am not pre-

a. Lancet, March. 26th 1898.

pared to say. Certain it is that cases at sea and on the sea-coast do not cough more than those inland and in the former places the air contains moisture enough. Nevertheless I should not personally, and do not think any one else would, select a damp climate for a Sanatorium. Where dampness in the air is associated with dampness of the subsoil it is most decidedly hurtful and when it is associated with great heat we get an atmosphere in which the bacillus of tubercle flourishes to perfection and Phthisis is rampant. The latter condition prevails on the coast line of Mexico, Nicaragua and in fact generally on the coasts of continents and islands placed within the tropical regions and here Phthisis is most pernicious. Like most of the other climatic factors I think it may be said that any effect rain and mist may have on the consumptive and on the results of the open-air treatment, is quite a secondary one. Rain certainly has a purifying action on the atmosphere, carrying down with it dust, smoke &c., and on the earth by washing away accumulations of obnoxious matter and in this way is of decided use to the consumptive.

Sunshine. The value of sunshine in the open-air treatment depends mostly on the fact that the presence of it allows the patient to spend most of his time out-of-doors and partly on its bactericidal properties. Districts favoured with much sunshine are invariably dry and hence most suitable for consumptives. The presence of sunshine does not necessarily imply the presence of heat and therefore the undoubted benefit derived from sunshine in Phthisical cases does not in any way depend on the heat. At Davos and other Alpine resorts the thermometer often shows 15° - 20° of frost when the sun is shining brilliantly.

Drs. Bourcart and Vivant at the British Medical Association Meeting in Edinburgh 1898 strongly advocated the claims of the South of France as a winter resort for Phthisis basing their arguments on the facts that the presence of so much sunshine and the absence of fog and cold winds rendered possible an increased daily period of aeration. This doubtless constitutes the main advantage of a sunny climate for Phthisis. The bactericidal properties of sunshine are not exerted on the tubercle bacilli within the lungs but on the organisms in the air, rendering it much more pure.

Bourcart and Vivant state definitely[a] that, if the conditions of hygienic treatment are the same, the results of treatment in the South of France are more favourable than elsewhere. In support of their statement they quote some remarkable results. In the early congestive stage they have 90 per cent "recoveries", and in the hectic stage with softening and cavity they have 20 per cent recoveries. I imagine by "recovery" they mean improvement.

Dr. Theodore Williams[b] with 200 cases of all stages treated in the Riviera obtained 65% "improvements" but only 5.9 arrests. I really cannot see why, the hygienic and other conditions being equal, Bourcart and Vivant should have such vastly better results than Dr. Williams. In the absence of any detailed account of their cases it is difficult to arrive at any satisfactory conclusion about their statistics. My own experience is that sunshine is a great advantage, but not an essential in the treatment. I am of opinion that the patients make more rapid progress under the influence of sunshine and are certainly in better spirits on fine bright days.

Temperature: A consideration of the Phthisis rates of the different parts of the world shows us that those most immune from Phthisis are the hot - dry and cold - dry. In populous districts the rate varies

(a) British Medical Journal, Oct. 1st, 1898.
(b) Lumbeian Lectures "On Aerotherapeutics", p.143.

but little, however widely different the temperatures may be, showing that the temperature, per se, exerts little or no influence on the prevalence of Phthisis. It must however be considered as a somewhat important factor in the open-air treatment. Turning to the life history of the tubercle bacillus, we find that its growth is most luxurious and in a moist warm atmosphere and much less so in a dry atmosphere, be it hot or cold. The heat on some of the exposed plains of India is not less than that of many of the valleys, and yet Phthisis is almost unknown in the former and is very common in the latter. Again, the heat on the shores of the Red Sea and on the banks of the Nile does not exceed that of the deserts around, and yet the inhabitants of the villages living in huts and stone houses in the former places suffer greatly from Consumption, whereas amongst the nomadic tribes of the latter, the disease is rare in the extreme.

Heat therefore, if unassociated with moisture in the air, cannot be regarded as a disadvantageous climatic factor but rather on the contrary, as an advantageous one, by allowing, if not too intense, the patient to take a longer daily period of aeration in comfort. Beyond this it has no claim. As to a low temperature, there is no doubt that it exerts a deterrent influence on the prevalence of Consumption.

Ransom suggests[a] that cold probably hinders the growth of the bacillus outside the body, and thus tends to prevent the infection and reinfection of susceptible persons. Cold air has a much smaller capacity for moisture than warm air and is probably thus less capable of sustaining the life of the tubercle bacillus, or it may be that the condensed moisture entangles the organisms in the meshes of the frozen vapour and carries them down out of harm's way. The cold parts of the world, viz. the Arctic and Antarctic regions and all the great mountain chains are, in Lombard's map of the distribution of phthisis, left blank, indicating immunity from the disease. Recent reports however contradict the assertions that Iceland, Greenland, etc., are free from phthisis and the immunity of the mountain chains doubtless depends largely on their sparse population. The fact however remains that phthisis is a rare disease in these cold climates, and in all probability when it does occur it is due to the insanitary surroundings and habits of the people.

Whatever speculations may be made as to the effect of cold on the prevalence of phthisis, it must be conceded that the sparsity of the population in these parts of the world is at the root of the matter, being instrumental in preventing pollution of the

(a) Practitioner: June, 1898.

atmosphere with the bacillus and its chief medium, organic matter. If therefore, we grant that the atmosphere of cold regions is much freer from all kinds of organisms than that of less rigorous and more populous districts, surely we may argue that a cold dry air is a most suitable one in which to conduct the open-air treatment. Of course, to obtain such a climate it is not necessary to send a patient to the arctic regions; but an ideal dry atmosphere is to be found in many parts of the world at altitudes varying from 5000 to 12000 feet. Here the barometric pressure is reduced. The sun's rays are transmitted with greater facility and the atmosphere is generally aseptic and dry. Beyond doubt such a climate and locality is the best for chronic tuberculosis of the lungs.

Dr. C. T. Williams[a] in his statistics of high altitude treatment of 247 cases[b] gives 83.4% improvements and 42.5% cures, results not equalled by any of the German or other sanatoria. Needless to say he is a firm believer in the efficacy of high altitudes in pulmonary phthisis and places it first[c] in his table of "Results of different Climates Compared.

(a) Practitioner: June, 1898, P.625.
(b) On Aerotherapeutics, P.143
(c) Ibid.

I believe I am right, however, in stating that he does not rely particularly on the temperature, but more on the dryness of the atmosphere, the absence of dust and smoke and other contaminations and the facilities for taking rest or exercise as the case may require (a).

To sum up as to the effect of temperature in the hygienic treatment of consumption, we must confess that it has but little direct influence on the results, but that if associated with dryness of the atmosphere, it may be of advantage.

CONCLUSIONS AS TO THE EFFECT OF CLIMATIC FACTORS:

Not only is tuberculosis a disease of all countries, under certain conditions, but of all climates. The inhabitants of all parts of the earth are liable to the disease.

A consideration of the phthisis rates of many of the chief cities of the world reveals the fact that there is but little difference, and what differences there are cannot be accounted for by difference of climate; but more easily by the presence of such adverse conditions as insanitation, overcrowding and poor food.

(a)"Treatment of Phthisis by residence at High Altitudes". C.T.Williams.

Proportion of Deaths from Consumption to 1000 deaths at:

| | | | |
|---|---|---|---|
| London | 121 | Rome | 114 |
| Paris | 143 | Milan | 132 |
| Brussels | 163 | Lisbon | 115 |
| Vienna | 208 | Athens | 183 |
| Berlin | 109 | New York | 167 |
| Stockholm | 160 | Rio de Janeiro | 186 |
| Christiana | 172 | Lima | 171 |
| St. Petersburg. | 151. | | |

(Lombard)

In some of the above mentioned cities the inhabitants are much more favoured in the matter of sunshine, warmth, etc., than we in London or the Germans in Berlin. Yet with the exception of Rome their phthisis rate is higher. Again, the extreme variations of the disease in places geographically close together are so great and frequent that they could not be due to difference in climate.. Lombard's map of the distribution of Phthisis proves this and nearer home we see the same wide variations.

Taking for example the county of Surrey (a) the towns Guildford and Farnham are but nine miles apart and yet have a difference of 284 per 100,000 living males in the phthisis rate.

Again, in Lincolnshire there is a difference of 155 between Spilsby and Caistor, distant about 40 miles from each other.

(a) "The Susceptibility to Tuberculosis under Different Conditions." Ransome, Practitioner, June, 1898.

In Scotland, in the Western Hebrides consumption is almost unknown; but in towns on the west of the mainland, with a similar climate and a similar race of people it is very common[a].

Dr. Haviland's map on the distribution of phthisis in England and Wales, and Boudins of France, all point to the same conclusion, viz. that climate, as such, has but little influence on the phthisis rate. It cannot, however, be said to have no influence because there are some climates less likely than others to promote the onset of the disease. The fact that the tubercle bacillus flourishes much more readily in warm moist climates, of which there are many examples in the world, than it does in either a cold-dry or a warm-dry atmosphere is conclusive proof that climate must bear some influence in the promotion and consequently in the treatment of phthisis. The parts of the world[b] where phthisis is almost absent are deserts, arctic regions and mountain plateaux. The sparse population of these districts probably explains to some extent their immunity from Phthisis, but it must be remembered that they have as a rule very dry atmospheres, a condition not suitable to the growth of the bacillus. It is possible however to live under conditions even in those favoured climates

(a) Ibid.
(b) Lombard's Map.

which will over-ride the natural opposing influences. I allude to such conditions as deficient nutrition, overcrowding in huts and houses and insanitary surroundings generally. The establishment of any manufacture in any of these districts, by crowding people together, would at once increase the phthisis rate. To make a broad statement as to the influence of climate in the open-air treatment of phthisis, one may say that consumption may be satisfactorily treated in any climate, but more so in some than in others. Where the air is dry, be it warm or cold, the results of the treatment will be more satisfactory than in districts where the atmosphere is moist and warm. Though there are districts which are comparatively immune from Phthisis, there are but few, if any, absolutely so. As pointed out before, all these districts possess a dry atmosphere and generally a sparse population. The latter, doubtless, has a bearing in the production of their low phthisis rate; but not more than has the well-known antagonistic effect of pure dry air on the growth of the tubercle bacillus. One cannot, I think, get away from the fact that climate does exert some influence, possibly secondary only, on the results of the open-air treatment; but not nearly to the extent it was formerly thought to exert. Given strict attention to precise regulations as to rest, exercise,

food and hygiene, the results of many districts, differing widely as to their climates, will be found to resemble each other to a remarkable degree. The following table by Dr. C. T. Williams on the results of different climates compared bears this out:

RESULTS OF DIFFERENT CLIMATES COMPARED.

| | No. of Patients. | Average Length of Residence. | First Stage. | Second and Third Stages. | Bilateral Affection. | Results. General. Improved. | General. Stationary. | General. Worse (Including deaths) | Local. Arrest. | Local. Improved (Including arrest.) | Local. Stationary. | Local. Worse. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Months. | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent | Per Cent. |
| High. Altitudes | 297 | 12.2 | 65. | 35. | 37. | 84.4 | 2.92 | 14.57 | 42.5 | 75.5 | 5.3 | 19.1 |
| Sea Voyages. | 65 | 1.6 Average of Voyages | 63. | 37. | 37. | 77. | | 21.56 | 7.7 | 53.3 | 10.7 | 33.8 |
| Riviera. | 210 | 9. | 59. | 41. | 36. | 65. | 10. | 24.80 | 5.9 | 36.6 | 17.8 | 45.6 |
| Home Climates. | 292 | 9.7 | 58. | 42. | 42. | 63.7 | 8.21 | 28. | 2. | 38.9 | 20. | 41.1 |

To conclude the consideration of climate Factors as affecting the open-air treatment of Phthisis one may say, if they are favourable - make use of them, if unfavourable - meet their deficiencies with suitable contrivances. The greatest difficulty that the physician has to contend with, in following out the treatment in general practice, is that of instilling into the patient and friends, the fact that weather, that is bad weather, is not detrimental to their living in the open-air.

LOCALITY AS A FACTOR IN THE OPEN-AIR TREATMENT.

To estimate the influence of locality in the open-air treatment of Phthisis it is necessary first to enquire into the prevalence of Phthisis in various localities. The conclusions arrived at when considering the influence of climate apply almost without exception to locality viz., that the prevalence of Phthisis depends more on the habits and surroundings of the population than on the locality itself. The most important consideration in connection with locality is the nature of the underlying foundation and subsoil of dwellings.

On referring again to Lombard's table of proportion of deaths from consumption to 1000 deaths in the chief cities of the world one is struck with

the little difference there is in their Phthisis rate and forced to the conclusion that the difference cannot be due to the difference of locality but more to the presence of insanitary surroundings, overcrowding and similar adverse conditions.

Apart from its principal streets there are few towns in Europe which can equal Vienna in the degree of squalidness and in the amount of genuine poverty and its sequelae, starvation, overcrowding and disease. It is this town, possessing a fine climate and well situated, that shows the highest death rate from Phthisis, which certainly goes some way to prove that any influence locality may exert on the prevalence of consumption may be completely over-ridden by the presence of the above-mentioned adverse conditions.

Of course some localities are notorious for the prevalence of Phthisis e.g. the coasts of Chili, Peru, Ecuador, Mexico, Nicaragua and Panama, the plains and coasts of Guiana, the west coast of Africa, the West Indies, the valleys and swamps of Ceylon, &c.

All these regions are hot and swampy and have a moist atmosphere charged with organic and nitrogenous matter, conditions most favourable to the propagation of tuberculosis. The inhabitants are in many cases debilitated by fever and malaria and hence are very

susceptible to infection by the bacilli of tubercle. Apart from such districts as these the difference in the Phthisis rates of localities is due to the nature of the occupations, the amount of overcrowding in houses and workshops, the sanitary surroundings, the nature of the dust to which the work gives rise and to the presence of infected houses and of infected areas. This latter point depends mostly on the nature of the subsoil and will be considered, under that heading.

If, however, locality, with certain exceptions cannot be said to influence the Phthisis rate it must be admitted that to some extent, probably only slight, it influences the results of the open-air treatment. An analysis of the statistics of many observers shows that results obtained are better in some districts than in others. As illustrating this we may refer to the table of Dr. Williams given above where we find he gives 42.4% arrests in high altitudes compared with 7.7% in sea voyages, 5.9 Riviera and 2% home climates. It is hardly fair to compare the results of High Altitudes and home climates as the former are all selected cases and the latter, as a rule are not, many being advanced when they came under treatment and their surroundings not exactly ideal. But allowing a fair

margin for such cases, I think one may reasonably conclude that the results obtained at High Altitudes are more favourable than those obtained at home.

ELEVATION. i.e. HIGH ALTITUDES.

It, is a recognised fact than consumptives may be successfully treated at altitudes varying from sea-level to 10,000 feet above and this seems to prove that elevation as such has no marked influence on the results. Sanatoria are as a rule established at considerable altitudes. The reason for this is not far to seek. In the present state of over population the only parts of countries not tenanted and therefore the only parts where the air is practically pure, are those not suited for commercial and agricultural purposes. Hence,it has been the natural sequelae that in the search fro a pure air, the founders of the Sanatoria have sought out suitable situations at varying altitudes.

When Brebner first established the Sanatorium at Goerbersdorf he enunciated amongst other principles that a definite minimum altitude, varying with the latitude was necessary. This however has over and again been proved to be erroneous. The same may be said of his idea that to be successful, the treatment

must be carried out in a district immune from the disease. On the other hand, his advice that Sanatoria should not be placed on or near centres of life and traffic, the need for strict supervision and unwavering adhesion to the rationale of the treatment, are as much to be regarded now as then. Some authorities believe that advanced cases of Phthisis do not do as well at a high altitude as at a lower one[a] but whether this is the case, is open to doubt. At many of the high altitude resorts for Phthisis e.g. St. Moritz, Davos, &c., the patients live at hotels, are seen occasionally by a doctor but largely are left to their own devices. The gaities of the place attract them, they participate in them and instead of improving they not infrequently get worse. Their retrogression is then put down to the unsuitability of the high altitude and this I think has something to do in the promotion of the idea that high altitudes are not suitable resorts for advanced cases of Phthisis.

One great advantage of a high altitude for a Sanatorium must not be lost sight of. I allude to the fact that the air around is not so likely to be - come contaminated by the smoke, &c., from towns at a distance. There is no doubt that smoke and dust are carried long distances in the air.

(a) Mander-Smythe, British Medical Journal, Oct./98.

The Honourable Rollo Russell in the Meteorogical Journal of April 1897 referring to "Haze" gives many instances of the air in the extreme South-West of Surrey being rendered much less transparent by the smoke of London, 40 miles distant, when a North-East wind was blowing. Another instance is given in the same Journal by Capt. Carpenter, stating that a fall of snow on the coast of Wexford was thickly coated by soot and dust, the nearest chimneys from which the soot could have come being those of the Welsh Collieries 90 miles distant.

At a high altitude, say from 5000 - 10,000ft., such pollution would not be likely to occur to any appreciable extent. The air at high altitudes, generally speaking, is more pure, more bracing and invigorating than at low levels and hence is more suitable for the Phthisical patient. A patient cured by residence at a high altitude is, I believe, better able to stand the routine of daily work on his return home than one cured in a more genial climate. As illustrating the point I may mention two cases, both medical men. Both developed Phthisis about the same time. One spent the winter at Davos, came back cured, two years since and now is working hard as a general practitioner in a town. The other sailed to Australia,

spent three months there, came back apparently cured but the disease again broke out and he died.

High Altitudes are generally immune from Phthisis and surely this must count something in their favour, whatever be the explanation of it. Taking all the pros and cons of the case into consideration I have no hesitation in saying that a high altitude, though by no means an essential, is an advantage in the treatment of Phthisis. If we accept the results of Dr. Williams and other observers as correct, I think we must grant that locality has some influence on the results of the open-air treatment.

THE INFLUENCE OF SUBSOIL.

Though Phthisis is undoubtedly fostered by dampness of subsoil, it is not quite clear how. The theory that a cold damp subsoil, by predisposing to cause Catarrhal diseases of the lungs and thus rendering people more susceptible to infection by tubercle, is not tenable, because there is no definite relation between Phthisis and other respiratory diseases. Thus at Birmingham and Brighton where the Phthisis rates are high the deaths from other respiratory diseases are few. At Pickering in Yorkshire again the Phthisis rate is one of the lowest

in the country and yet the other diseases of the lungs are almost as common as at Brighton. Many authorities assert that simple Catarrhal affections of the lungs rather diminish than increase the tendency to consumption.

Dr. Ransome's researches(a) into the matter induced him to put forward, what seems to me, a very probable explanation of the influence of subsoil. He shows that from a damp subsoil whether pure or impure, aqueous vapours arise and condense on the walls and floors of the houses above. He further proves that these collections of fluid afford an admirable cultivating medium, even at ordinary temperatures, for the bacillus of tubercle, and in this way keep alive and perhaps increase, the virulence of the organism in tubercle infected houses.

It is reasonable to conclude that the air of houses on well drained soils will be less likely to allow condensation of the vapour to take place on the floor and walls than it would in houses less perfectly protected from the damp. In fact, the better drained or more porous the subsoil is, the less amount of emanation and consequently condensation of aqueous vapour there will be.

(a) Weber - Parkes Prize Essay 1897.

The following table, on the permeability of subsoils to water and the emanations in the air therefrom illustrates this point.

| (a)Nature of Subsoil. | Permeability of Water. | Emanations into the Air. |
|---|---|---|
| 1. Primitive rock-clay slate and millstone grit. | Slight. | None. |
| 2. Gravel and loose sands with permeable subsoils. | Great. | Slight. |
| 3. Sandstone. | Variable. | Slight. |
| 4. Limestone. | Moderate. | ——— |
| 5. Sands with impermeable subsoils. | Arrested by Subsoil. | Considerable. |
| 6. Clays, Marls and Alluvial Soil. | Slight. | Considerable. |
| 7. Marshes, when not Peaty. | Slight. | Considerable. |

If, then, the condition of the subsoil is such as to allow of the emanation and condensation of aqueous vapour, producing a suitable medium for the tubercle bacillus to grow and propagate in, it is quite possible for Phthisis to become endemic in a house and even in a district, and probably the fact of several members of a family dying of consumption in a house may be partly accounted for in this way.

(a). "Book of Health", P. 594, by Malcolm Morris.

Dr. Haviland in his conclusions, deduced from his researches into the distribution of Phthisis in England and Wales, says, "A damp clayey soil is coincident with a high mortality." The Registrar General of Scotland, in his seventh report, says, "The towns, villages, hamlets or houses which were situated at or near undrained localities and were on heavy, impermeable soils, or on low lying ground and whose sites were consequently kept damp, had a much larger number and proportion of cases of consumption than towns, villages, hamlets or houses which were situated on a dry or rocky ground or on light porous soils where the redundant moisture easily escapes".

Dr. Buchanan when Chief Medical Officer to the Local Government Board made an exhaustive enquiry as to the circumstances associated with the prevalence of Phthisis in Surrey, Sussex, and Kent, and summed up his conclusions that "Wetness of soil is a cause of Phthisis to the people living on it."

Dr. Ransome in his Weber-Parkes Prize Essay /97 contrasts the phthisis rate of two diverse localities, viz. low lying clay lands and a hill of sand, and shows that the former, though only possessing one-fifth of the population of the latter, has a greater number and a much greater proportion of deaths from consumption.

I know, from personal experience, that in the fen districts of Lincolnshire, where in many places the sub-soil is clay and the houses are at sea-level, consumption is much more prevalent than on the Wolds where the subsoil is more gravelly or of a limestone nature. I have also noted that the cases in the Fens seldom recover, even temporarily, and run a much more rapid course than do those on the Wolds. This may be merely a coincidence; but I am inclined to attribute it to the nature of the sub-soil which allows water to accumulate near the surface and find its way into the houses above in the form of aqueous vapour and thus keep up, for the tubercle bacillus, a supply of a most suitable medium. Again, all authorities agree that on hills, elevated plateaux, and in deserts, where the drainage is naturally good, tuberculosis of the lungs is rare.

Such facts as these point to the conclusion that there exists a close relationship between the condition of the soil and the prevalence of phthisis. This being so, the nature of the subsoil must play an important part in the open-air treatment of phthisis. It is surely common sense that if the patient live in an atmosphere containing considerable quantities of aqueous emanations of the subsoil (a condition favourable to the organism and therefore assisting in rein-

fection) he has not the chance of recovery he would have if living in a soil from which there were no emanations of aqueous vapour.

It is an incontestable fact that, where the subsoil is of such a nature as to allow of free drainage or has been artificially drained, phthisis is less common than where it allows of accumulation, hence it must follow that, in order to obtain good results in the open-air treatment of consumption, a sub-soil allowing free escape for surface water is necessary.

PRINCIPLES OF THE TREATMENT.

These are essentially hygienic and dietetic, viz., almost constant stay in the open air in localities where the air is pure; careful regulation of rest and exercise, both bodily and mental; and abundant nutrition. To give such instructions to a patient is a simple enough matter; but the carrying out of them in their full is where the difficulty comes in, and unless the patient is under constant medical supervision (which can only be obtained at a sanatorium) it is safe to say that the doctor's instructions will, in most cases, not be carried out. The patient must, at the outset, be impressed with the fact that the treatment to be adopted is the

only one, practically, from which he can derive benefit, and that any deviation from the rules laid down may have serious and perhaps fatal consequences.

In a sanatorium, of course, the patient is obliged to conform to the regulations of the establishment; but it is in private practice that the difficulty of obtaining implicit obedience to one's orders arises. If however, the patient and relatives possess sufficient common sense to appreciate the force of one's arguments, the difficulty is considerably lessened. Only however in a sanatorium can we expect to see our instructions carried out to the letter. Sending a patient away to some health resort with directions to be in the open air as much as possible, to take plenty of exercise and eat largely, often ends disastrously. The patient, left to his own devices, forms his own opinion as to what constitutes the proper amount of each. Some imprudence in the matter of exposure, exercise or food perhaps causes pleurisy, haemoptysis, gastric disturbances or some other complication, which, had he been under medical guidance, would in all probability never have occurred. It is always advisable that the patient be seen every day or at least every other day by a medical man well acquainted with consumption and with the peculiarities of the climate. He can then prescribe at each visit

the nature and amount of food to be taken, whether or not the patient is to take exercise and what sort of exercise, how long, and at what time of day he is to be out of doors, etc. All this can scarcely be done satisfactorily except in a proper sanatorium with resident medical men. The habit of sending patients to live en **pension** at a hotel in some health resort with instructions to see a local doctor every so often is to be condemned. In the intervals of each visit most likely the patient will indulge in some imprudence with disastrous results.

As to the requirements for a sanatorium I cannot do better than quote Dr. Herman Weber, than whom no one is more qualified to speak on the matter.(a)

"The sanatorium building ought to be thoroughly hygienic; all the bedrooms and sitting-rooms, including the social rooms, ought to be well ventilated, with good warming apparatus, and with exposure to the south, south-east or south-west. The sanatorium must possess sheltered verandahs, open balconies with moveable screens and shelters, and open halls with beds or bed-chairs for each patient to lie on during the greater part of the day till late at night. The building ought to be situated on well-drained, dry soil, in pure air, away from the contamination

(a) The Practitioner, June. 1898, p.617.

of large towns and factories. If possible, the south slope of a hill ought to be selected, with shelter from all cold winds, and as much as possible from all strong winds, since the latter are to most cases of pulmonary tuberculosis injurious. The neighbourhood of forests is desirable for the sake of their purifying influence on the air, and also for shelter from the sun in the heat of summer and from wind at all times; pine forests are preferable, as they have special advantages, particularly in winter. The sanatorium must be provided with hydrotherapeutic and gymnastic apparatus. As to climate, sheltered alpine slopes are decidedly preferable, for many reasons given in climato-therapeutic works; but, fortunately, we may say that tuberculosis is curable in all climates with pure air, if the good points are thoroughly utilised and the deficiencies counteracted and supplemented by artificial means."

Taking next the consideration of food. It is absolutely necessary that the patient have large quantities of easily digested food. The capricious nature of the appetite in Phthisis, and the common occurrence of gastric disturbances such as dyspepsia, vomiting, etc., renders the question of feeding of vital importance. Many English patients find the nature of the food at the German sanatoria one of

their greatest difficulties. The German is naturally a large eater, especially of dishes which to British tastes are most unpalateable, and, I fear, is wont to judge of the gastronomic abilities of other nations by his own standard. I feel convinced that when the sanatorium system becomes more general in Britain, the food question will be more easily solved. A good chef is a most desirable acquisition to a sanatorium as the food should be presented to the patient in as palatable a form as possible. The arrangement of the meals varies in different Sanatoria. At Nordrach, I was surprised to find that only three meals are allowed and the patient is obliged to take the quantity placed before him. This frequently at first necessitates an adjournment to vomit, but the patient is expected to return, and finish his meal, which he generally does without much difficulty. The food at Nordrach is decidedly rich, consisting largely of milk, meat, fatty and carbo-hydrate food. I am told, however, that dyspepsia is not common amongst the patients, the long intervals between meals and the rest before and after evidently, aiding in complete digestion. Cases confined to bed with pyrexia are expected to consume as much, and sometimes more, food than those taking out-door exercise. At most of the Continental sanatoria the meals are not as

substantial as at Nordrach, but make up what they lack in this respect by greater frequency, the intermediate meals, generally two or three in number, consisting largely of milk. If the milk causes dyspepsia, it is left off. Alcohol is given sparingly and spirits generally prohibited. Drugs are seldom used except to relieve urgent symptoms. Cod Liver Oil, Creosote, and other so-called specifics are never employed. The patients generally take their meals under the eye of one of the resident doctors, who sees that each patient takes his proper amount and that no shirking meals occurs.

The sputum is always carefully disposed of, after disinfection, and soiled handkerchiefs and linen are disinfected by boiling. Spitting indiscriminately is strictly prohibited, all patients being provided with a pocket flask, containing a disinfectant, for that purpose. Amusements are limited, it being thought that the patient has plenty to do in following out the rules of the establishment. At Loomis , in America, there is a billiard room in a building set apart for amusements. At most of the sanatoria there are no common rooms, the crowding of the patients together not being encouraged. At Hohenhonnef, however, there is a fine suite of assembly rooms commun-

icating with one another. The patients have ample time for reading during their reclining hours and the supply of books is generally good. Active games, owing to the dyspnoea they would cause, are never allowed. At Nordrach much stress is laid upon mental repose and anything which might cause excitement is forbidden.

The visits of friends are not encouraged here; but other sanatoria, e.g. Rieboldgrun, allow it and even go so far as providing a special house for visitors. Provided the friends do not interfere with the patient following out his instructions, I cannot see any harm in their visiting them or even living near the patient. All the rooms in the sanatoria are so constructed as to be easily cleaned and dust is prevented from accumulating by using damp cloths on the floors and walls every day. Unnecessary furniture, curtains, hangings, cushions, and in fact any articles which might retain infection are not allowed in the rooms. The furniture is of the simplest nature and can all be washed without damage. The heating is done by hot water or steam pipes, occasionally by stoves. Ventilation is carried out by the windows which are always open; draughts are warded off by special screens.

Hydrotherapy, with a view to hardening the

patient and lessen his susceptibility to chills, is practised in many of the sanatoria. The patient is first dry-rubbed, then with spirit and water and then douches at various temperatures are used. Some of the establishments possess quite an elaborate system of douches, baths, etc.; at Nordrach there is a hot and cold douche in every room. A private dairy is generally kept and to prevent any possible contamination from the milk supply the cows are tested every so often with tuberculin and the milk is always filtered through thick felt.

The question of exercise is of vast importance. It must be remembered that in Phthisis the lungs are not the only organs which suffer; the heart and circulation are weakened and all the organs are thereby ill-nourished, not excepting the brain; hence any undue strain upon any of the organs of the body may have most alarming results. It therefore becomes one of the chief functions of the medical men in charge of a sanatorium to regulate the amount of exercise and rest of each patient according to the condition. The nature of the exercise indulged in varies in different sanatoria and over-exertion is never allowed. In general practice the relapses in the early stages, when the patient seemed well on to recovery, are almost invariably due to the patient

abusing his partly recuperated powers. When there is any pyrexia the patient is not allowed to take any exercise at all; but has to lie either in bed in his room with the window open or on a chair in a verandah until the pyrexia disappears. At Falkenstein exercise is not a prominent feature and rest in lounge chairs in pavillions and other sheltered places is more relied on. At Nordrach, the patients, when not feverish, spend a large part of their time walking about in all weathers. The paths are admirably arranged in slight ascents and the patient's daily walk is mapped out for him. In all cases the exercise is gradually increased and patients, who at first could not walk a few hundred yards without dyspnoea, gradually find themselves able to traverse several miles and even climb considerable ascents, without difficulty. The patients are enjoined not to talk much when walking, and to avoid this are often sent for their walks alone. If any dyspnoea comes on they immediately rest. Slight gymnastic exercises are sometimes allowed in cases nearing recovery.

RESULTS OF THE OPEN AIR TREATMENT:

Many sanatoria have published statistics of their results from which it appears that in from 24 to 44 Per cent of the patients the disease is apparently

cured, while about two-thirds show great improvement after a few months treatment. At Davos, St.Moritz, and other Alpine resorts the results are even better; but the patients as a rule stay longer. There is, however, a remarkable similarity in the results of most of the sanatoria,despite their diversity of climate, which shows that the general methods of the treatment are of more importance than the climate.

Dr. Leon Petit in his book "Le Phthisique et son Traitement hygienique", p.49 remarks on this fact. Of course the results are very much affected by the stage of the disease on admission. The table of results of 5,032 cases published by Brehmer[(a)] is a very good example of all the other sanatoria and has the merit of distinguishing between the stages of the disease, a point not brought out in many of the returns though his results are not as favourable as some. The table is given here:

| Stage of Disease. | Number. | Cured. | Nearly Cured. | Total. |
|---|---|---|---|---|
| I. | 1390 = 27.62% | 387 = 27.8% | 430 = 31 % | 817 = 58.8% |
| II. | 2225 = 44.21% | 152 = 6.83% | 325 = 14.6% | 447 = 21.43% |
| III. | 1517 = 28.17% | 12 = 0.84% | 33 = 2.3% | 45 = 3.14% |
| | 5032 | 551 = 11.0% | 788 = 15.6% | 1339 = 26.6% |

(a) "Sanatoria for Consumptives" by v.Jarentowsky, Translated by E.Clifford Beale, M.D.

Dr. Knopf in his work "Sanatoria pour la Phthisie Pulmonaire," has given statistics from a number of Sanatoria. Acording to his table 70% improvements are claimed, with 14% absolute and 14% relative cures. The value, however, of most of the returns is discounted by there being no definite account of the stage of the disease on admission.

Dettweillers results of the treatment at Falkenstein, as published by Dr. C. F. Williams in Medico-Chirugical Transactions Vol. LXXI., give 13% cures and 23.2% improvements. These results compare unfavourably with those of Dr. Williams[a] (who gives 42.5 arrests and 75.5 improvements by treatment at high altitudes. This difference is doubtless partly explained by his cases being selected. Among other contra-indications for high altitudes he mentions Pyrexia,[b] cases of double cavity and all advanced forms of tuberculosis of the lungs, some cases of hemorrhage, catarrhal, laryngeal, and acute Phthisis. By thus selecting his cases he obtains results better than the Sanatoria, where many patients dangerously ill and far advanced in Phthisis are annually sent. As to the results of treatment at home those published by Dr. Burton Fanning[c]

(a) On Aerotheropeutics, P. 143.
(b) Practitioner, June, 1898. P. 627.
(c) Lancet, March, 12th 1898. P. 714.

are of great interest as showing what can be done in institutions in this country. He gives results of 24 cases all treated at Cromer; 8.3%are absolute cures, 16.73% are "relative" cures and 70.8% he gives as greatly improved, though of these 4.4 subsequently died of Phthisis and 12.5 of other diseases within twelvemonths of leaving Cromer. Though his cases are few I have given his results in percentages so as to render comparison with those of the Continental Sanatoria easier. Dr. Burton Fanning labours under a considerable difficulty, viz. that the institution is not one solely for the use of consumptives, but a general convalescent home and he is thus not able to keep the patients as long as is desirable nor to feed them as well as he would like to. I have no doubt, that with greater facilities he would have obtained results quite equal to those of any of the Continental establishments. I an not aware that any detailed results of the treatment at Craigleith have been published. No statistics about Nordrach are available, it being thought that it has not been in existence long enough to justify their publication. We must await their appearance with interest as according to Dr. Mander Smyth and other advocates it is of all the Sanatoria nulli secundum. My own cases, ten in

number, are too few to draw any conclusion from and I have had the disadvantage of treating them all in their own homes. Of the ten, two came under observation in the early stages, about March 1896 and both are apparently cured, that is, they have lost all cough, night sweats, pyrexia, physical sounds and bacilli from sputum and have gained flesh. They are now following an outdoor occupation. Three have died. One was a soldier and one was a sailor, invalided out of the services in the early stages of the disease. They failed to come under treatment until their cases were hopeless. The third was a young woman in good circumstances, who came under treatment early, but who never showed any improvement whatsoever, the disease being acute and running a very rapid course. The remaining five are still under treatment, but have only been so for periods varying from three to six months. They have all improved, especially as to lowering of evening temperature, diminution of night sweats and increased appetite and improved feeling of well-being.

I have made but scanty reference to my own cases, as, owing to their small number, and to the disadvantage of having to carry out the treatment at home, they cannot possibly be of any use from a stat-

istical point of view. I am, however, much encouraged by the results, as much almost by the manifestly improving cases, as by the two cured ones, and am fully convinced that provided strict attention is paid to the essential details of the open-air method, results quite as good as those of the Continental sanatoria may be obtained in this country. In my own cases I have had resource to tents and small wooden buildings with movable sides and have followed as closely as possible the rules of the continental sanatoria. In fine weather I have found driving, in a comfortable carriage, at a moderate pace, an advantage. I do not suggest that it had any particular therapeutic effect, but it varies the monotony of the patient's life and certainly does no harm. Reference will be made later as to meteorology, etc., of the district in which the cases mentioned above were treated, when I hope to prove that it is a more suitable one for the open-air method.

Local Results: Whatever differences may exist in the general results of various sanatoria, the local results are in favourable cases all on the same lines, viz., gradual diminution of all symptoms and general improvement of health. The temperature which at first may in the evening reach 102°-103° soon shows signs of decline, and in the course of a few weeks

reaches the normal. Co-incident with this there is a most noticeable diminution of the night sweats and consequently less feeling of lassitude in the morning. The patient thus feels more capable of enduring the fatigue of moving about; his appetite increases, and the cough decreases. With the decrease in the cough there is less sputum, but not for some time is there any apparent decrease in the number of tubercle bacilli, and in fact I have found the sputum of patients who are rapidly improving contain more bacilli than at first. This, however, lasts but for a short time, and soon the diminution in their numbers becomes very apparent, until at last no sputum to contain bacilli is obtainable. An improvement of the bodily weight and an increased feeling of well-being reacts most favourably on the patient's mind, producing contentment with their surroundings and a great desire to still further improve.

As to the physical signs, the amount of alteration they undergo varies with the stage of the disease when treatment was first started. If in the early stages, they entirely disappear. If a cavity exists at the commencement, though the sounds over it considerably diminish, both in resonance and area (owing to contraction of the healing lung) it is still possible to locate it, both on auscultation and percussion.

SUMMARY:

My aim has been, not to indicate the methods of any particular sanatorium, but to give broadly the essential details of the system as carried out in all of the sanatoria. As stated before, the method differs in certain points in different sanatoria, but the outstanding principles are the same in all. The absolute necessity for constant residence in the open air, the equally important points of large quantities of easily digested food, the proper regulation of rest and exercise, and strict observance of the laws of hygiene are facts upon which all authorities are agreed. As to the use of hydrotherapeutic measures opinions differ. Those advocating its application claim that by it the patient becomes hardened and is much more capable of resisting the vagaries of climate and consequently colds and chills, than he would be had he not undergone this special treatment. I am not aware that there are any available data showing that the patients of any sanatorium where the hydrotherapeutic system is not extensively used are more subject to colds and chills and relapses than those in an establishment where sponging, douching, etc., constitute one of the main points of the treatment. Personally, I am in favour of hydrotherapeutic measures, as whether they harden the patient or not, they

certainly produce an increased feeling of well-being and brace the patient up very considerably. Another point I would like to emphasize is the benefit to be derived from regular and systematic practice of taking a series of long deep inspirations every so often. By this means the capacity of the chest is rapidly and markedly increased with the natural result that a greater area of lung is brought into direct contact with the pure air. I always advise my patients to start with a series of six deep breaths about every two hours. The number and frequency can be gradually increased, and I am quite convinced of the benefits to be derived from the practice. I know quite well there is no novelty in the idea, but think it a point often neglected when giving instructions to a consumptive patient.

Having shown that none of the factors considered, with the exception of subsoil, have any marked detrimental effect on the results of the open-air treatment, we naturally come to the question, to what extent is the method applicable to this country? The answer is, undoubtedly, in its entirety. None of the Continental sanatoria possess, nor do they claim to possess, a monoply of any or all of the factors which may directly or indirectly affect the results. The weather at many of them is quite as changeable and often more severe than we get it. The winters are frequently

longer and colder, the summers decidedly hotter, and the rainfall as copious, and often of a more tropical nature than in Britain. The drainage is no better than can be obtained at home, nor is the sub-soil a peculiarity possessed by many of the sanatoria. The food question would, I think, be more easily settled for British patients by British physicians than by physicians of other nationalities. All the other details of the treatment can be as successfully and intelligently carried out in this country as in any other. Hence, then I see, and for that matter does any one else, no objection to a wide and universal adoption of the method in our climate. Many British patients object to living in an institute of more or less barrack like proportions, and would much prefer a small establishment. There are hundreds of medical men in England and Scotland living in places admirably adapted for following out the open-air method on a limited, but none the less effective scale, and doubtless many of them would, if encouraged, go to considerable expense and trouble in making their establishment still more suitable for small numbers of consumptive patients. In this way I think, the phthisis rate would be soon markedly reduced. The consumptive poor, however, must of necessity, be treated in large central sanatoria, and

I have no doubt these will soon be as common with us as asylums are. Beyond the Craigleith Hospital, I know of no institution in England or Scotland where the phthisical poor can be treated with the open-air method free. Many of the convalescent homes, notably that at Ventnor in the Isle of Wight, receive consumptives of the poorer classes, and partly follow out the principles of the treatment, but at all of them I believe some charge is made. Now such an active crusade against tuberculosis has been started, and the matter in many cases taken up by the municipalities and County Councils, the time cannot be far distant when the chances of a poor person recovering from phthisis will be no less than those of the rich, which at present is far from being the case.

Private institutions are growing in numbers apace in this country. One has been started in the Cotswold Hills near Cheltenham, several at Bournemouth, and Dr. Mander Smythe is building one in the New Forest to be carried out on the principles of Nordrach. So far as I can ascertain, the founders of these establishments are all believers in the views that climate has little or no direct effect on the results, but at the same time, are equally emphatic that when favourable, the climatic factors

should be taken advantage of to the fullest extent, Though any considerable altitudes are unobtainable in the British Isles, there are numerous spots well above sea level, where the air is pure, the position protected and the sub-soil of a most favourable nature. There is not, I think, certainly in the South of England, any locality better adapted, meteorologically, or geologically, or geographically than the Hind Head district of Hampshire, of which I herewith give a brief description.

# NOTES ON HIND-HEAD.

## General Features of the District.

Hind-Head, rising as it does to an elevation of 950 feet above sea-level, is one of the most conspicuous eminences in the South of England. It is situated on the South-West-border of Surrey and North-East-border of Hampshire, is 40 miles from London and about 12 miles from Guildford. The nearest station is Haslemere on the L. & S. W. Ry., 4 miles distant. It will thus be seen that the air here is most unlikely to become contaminated by the smoke &c., of towns. Mr. Jonathan Hutchinson in a communication to me says "I regard Hind-Head as competing with Crowborough (in Sussex) as the finest air in the South of England. The air is very invigorating and dry and especially good for Phthisical and Rheumatic Subjects. In winter the hill tops, where exposed, are cold, but the air is dry and bracing, and if there is any sun you get it. It is an excellent place for both summer and winter residence and without its equal, in Southern England as a place for Sanatoria."

Mist is not common and the rainfall low, though at times the showers are almost tropical. Owing however to the extreme porosity of the soil one can

walk out five minutes after heavy rain and not find the roads muddy. There are no bogs, wet places or ponds on Hind-Head and no cowslips (a good indicator of dampness in the soil) for several miles. The Whortle Berry and broom flourish on the heaths and they are good test plants as regards the healthiness of the district.

Owing to the poorness of the soil the vegetation is characteristic, consisting as it does of pines, birches, gorse, broom, heath and Whortle Berry. No where in the South of England is there, so far as I know, so wide an expanse of country covered with these plants, which ~~are~~, invariably associated with dry subsoil and which give a characteristic odour to the whole country in winter and summer alike. Pine woods are numerous and extensive, providing any amount of sheltered nooks and by their evergreen nature dispelling any idea of bleakness the place might possess in winter were it otherwise wooded, and making the district beautiful all the year round.

The views to be obtained from Hind-Head are of rare beauty and great extent and on clear days objects at 20 - 30 miles distance can be distinctly seen.

The view over Woolmer Forest, Weaver's Down and Harting Coombe comprising every possible variety of

scenery from cultivated land to the extensive heaths and pine forests cannot be surpassed for its beauty.

The roads are excellent and as I said before rarely, if ever, muddy and the drives are of great beauty and almost innumerable. The water supply is good and the water of the purest, being obtained from very deep wells. It is only within the past few years that any one, with the exception of cottagers, has resided in the district and as it forms parts of two districts of two different Unions, I am unable to obtain any reliable statistics as to the death rate. Longevity however is a marked feature of the families who have lived there all their life and Phthisis is almost unknown amongst them. Dr. Ardagh of Haslemere, who has practised in the district for 13 years assures me that the death rate from Phthisis must be very low and that in all his experience of the place he has only known of two or three cases of Phthisis which have developed there. Doubtless the sparsity of the population would here, as elsewhere, affect the Phthisis rule; but against this I would point out the fact that the cottagers surroundings were frequently most insanitary, large families often crowding into two or three small badly-ventilated rooms, producing, in fact, an ideal atmosphere for

the propagation of tubercle, but as this did not occur, I take it that the district may be set down as being very healthy and possessing a dry, invigorating air, and, in fact, as being a most suitable place for the open-air treatment of Phthisis.

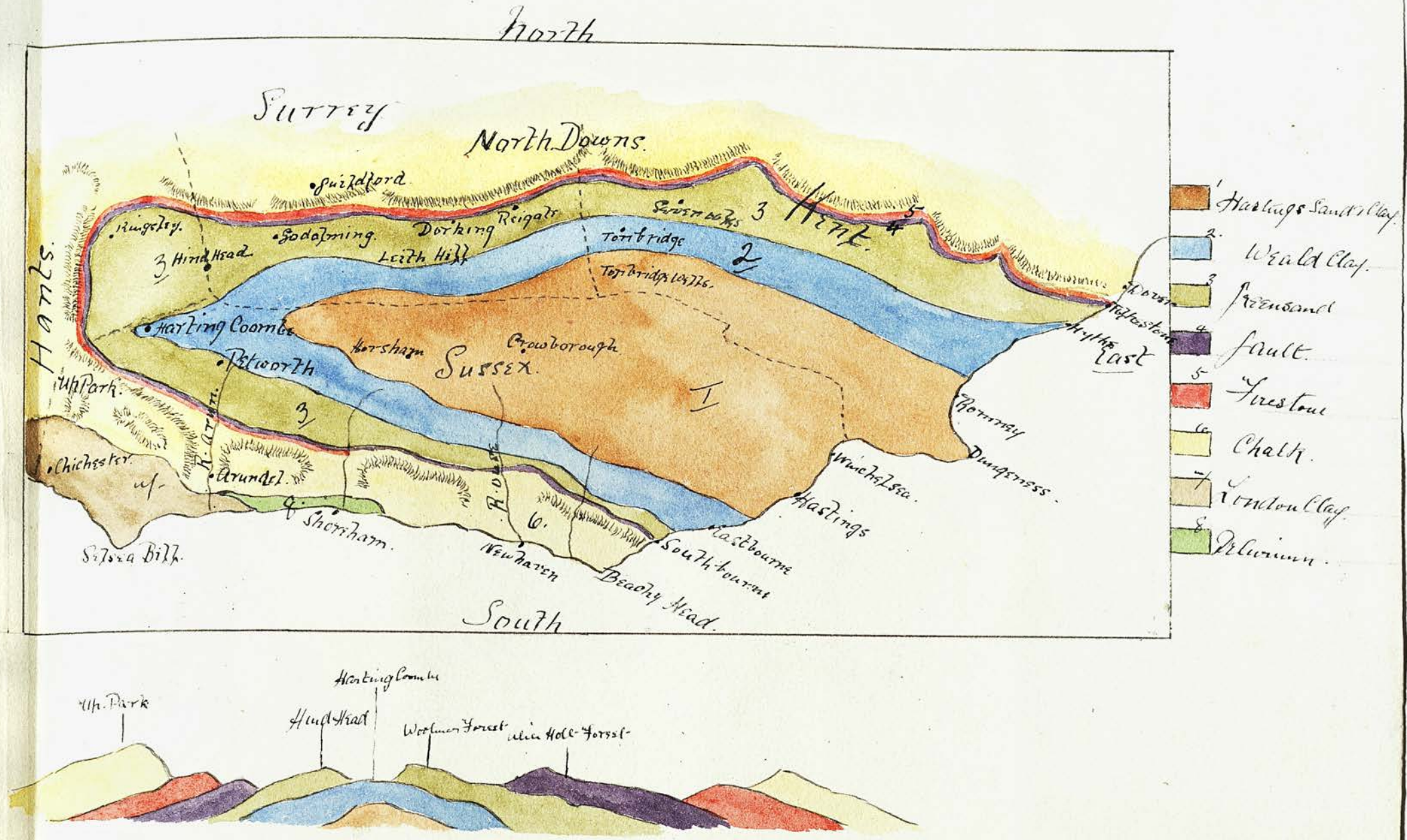
I append some notes on the geology and meteorology of the district.

GEOLOGY.

Hind-Head forms almost the western end of the escarpment of the lower green-sand - a great V shaped escarpment of which Harting Coombe is the true apex, the northern arm extending by Hind-Head, Leith Hill, Reigate &c., to Hythe and Folkestone, and the Southern by Petworth to near Eastbourne - enclosing a wedge shaped area, the weald of Sussex and Kent. The position of Hind-Head almost at the apex of this great wedge is the chief cause of the extreme beauty of the Eastern outlook. Geologically Hind-Head consists of the "Hythe beds " of the "Lower Greensand." Beneath them lies the Atherfield Clay and beneath it the Wealden Clay.

The Lower Greensand here is formed of a great number of beds of coarse yellowish or reddish sand generally hardened into sandstone with here and there bands of calcareous stone and ironstone. In connection with the presence of the latter a peculiar feature may be occasionally noted. If trees are

Map illustrating the Geology of Hind Head and surrounding district.



planted over a band of ironstone near the surface they flourish until the roots come in contact with the ironstone and then die off. On Hind-Head itself these impervious layers occur only in isolated patches and interfere in no way with the natural drainage. The sands and sandstones of the lower greensand are very pervious to water and there is no accumulation until the narrow belt of Atherfield Clay is reached, hence the good roads and paths through which the rain soaks as rapidly as it falls. The layer of green-sand is very thick, being in some places as much as 200 - 250 feet in depth, and it is through this thick stratum that the water percolates until arrested by the impervious Atherfield and Wealden Clays.

METEOROLOGY.

The following meteorological observations extend only over a period of three years viz., 1896 - 97 - 98 and hence cannot be of the value that a longer series of observations would be. During the three years in question there has been no really severe weather in the winter, consequently the average temperature appears higher than it would do, were the data of a rigorous winter included. Hind-Head however during severe winters is by no means unpleasant.

Mr. Jonathan Hutchinson says "My family spent the

winter of 1887 (an arctic one) on the top of Hind-Head and we enjoyed it very much, although all our roads were cut through deep snow." The presence of so many pine woods is of special value as a means of affording protection from wind and cold in winter and renders sitting in the open air a much more pleasant occupation than in less protected parts.

RAINFALL 1896.

| Total Depth in inches. | Number of days on which rain fell. |
|---|---|
| 32·18 | 160. |
| 1897. | |
| 32·25 | 154. |
| 1898. | |
| 28·58 | 139. |
| Average for three years | Average for three years. |
| 31·3in. | 151 days. |

This cannot be considered a heavy fall and the fact that it takes 151 days on which rain falls to accumulate 31·3in., points to the conclusion that there cannot be many occasions on which it rains for a whole day; and it is a fact that a whole day of rain is rare. This, together with the extreme porosity of the soil, accounts for the dryness of the paths

and roads.

The great variance in the amount of rain falling in one month of the different years makes it somewhat difficult to state the wettest month, e.g., September 1896 has a fall of 7·24 inches, whereas, the same month of 1898 has only 1·69 inches. On an average, however, December is the wettest, with a fall of 4·82 inches and July the driest with ·97 inches. Even in the wettest months there are but few days on which a patient cannot take a walk in comfort and keep dry, both under foot and above. The rain percolates so rapidly through the porous soil that, even in hot weather, mist after rain is very rare.

SUNSHINE.

I am only in possession of records of the amount of sunshine for two years, viz., 1896 and 1898, the recorder having become unreliable about the middle of 1897. For 1896 the number of hours of sunshine was 1371 giving a daily average of nearly four hours. For 1898, 1513 hours of sunshine were registered, giving a daily average of a little over four hours. This is, I consider, a high average for a changeable climate like ours and is doubtless owing to the elevation of the district and to the almost complete absence of mists. I am well aware of the difficulty

in obtaining reliable records of sunshine, but give these as I think they are correct, being taken by a most careful meteorological observer, Dr. Robert Barnes, to whom I am much indebted for the use of his records.

TEMPERATURE.

It is with diffidence that I give the following records as I feel that the absence of any really severe winter weather during the period under review, by giving a higher average temperature, may produce a wrong impression of the climate of the district. The records, of which I only give the means, are from meteorological observations taken at 9a.m. daily, by Kew registered thermometers placed in a Stevenson's screen.

1896.

| Mean Temp. during year. | Mean Range of Temp. |
|---|---|
| 49·8 | 12·8 |

1897.

| Mean Temp. during year. | Mean Range of Temp. |
|---|---|
| 48.3 | 12·4 |

1898.

| Mean Temp. during year. | Mean Range of Temp. |
|---|---|
| 49·5 | 13·1 |

The great similarity of the records for the three years is at once apparent. The highest temperature registered during the time was 86°.7(a) Sept. 12th 1898, and the lowest .24° (a) Dec. 20th 1898 and the highest mean range during any month was 20°.3 (August 1898) and the lowest 6°.5 (January 1898). I am painfully aware that these records, owing to the limited time over which they extend and to the fact that, during the years they have been taken the weather has been of a most open description, do not give as correct an impression of the climate of the district as would a more extended series of meteorological observations. I have therefore given them in as brief a form as possible.

My object has been to show that the climatic factors of the Hind-Head District are such, that if taken advantage of, the place is a most suitable one in which the open-air treatment of Phthisis may be successfully carried out, either privately or in a Sanatorium.

CONCLUSION.

Phthisis is, undoubtedly, if taken in the early stages, a most curable disease and fortunately is curable in almost any district. Nevertheless there are districts which, owing to natural advantages, such

as protection by woods, porous sub-soil, and favourable climatic conditions, are better adapted for the carrying out of the open-air treatment than districts where the surroundings are less favourable and where artificial means have to be largely employed to counter balance the prevailing adverse conditions.

For the following reasons I contend that Hind-Head, though it may be equalled, is certainly not excelled by any district in Britain, for its suitability as a residence for consumptives, and as a place where the natural surroundings are of such a favourable nature for the successful practice of the open-air or hygienic treatment of Phthisis. viz:

1. It is situated at a good elevation.
2. The sub-soil is of a most porous nature.
3. The air is dry, pure and invigorating and is not likely to be contaminated by the dust and smoke of towns.
4. It is well wooded by extensive pine forests providing shelter from the sun in summer and from the wind at all times and exercising a purifying influence on the air.
5. It has a South aspect and is well favoured in the matter of climate.